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Second redesigned external tank arrives at KSC

From combined NASA reports

NASA's second redesigned Space Shuttle External Tank, designated for use on Atlantis' Return to Flight mission STS-121, is now in place at NASA's Kennedy Space Center, Fla.

Following a 900-mile journey at sea from the Michoud Assembly Facility in New Orleans by NASA's Solid Rocket Booster Retrieval Ship Freedom Star, the External Tank was off-loaded from the barge and transported to the Vehicle Assembly Building.

NASA shipped its External Tank March 5. This marked the first step toward final launch preparations for the launch of STS-121, possibly this summer. The mission is the second test flight of the Space Shuttle following the Columbia accident.

The tank, designated ET-121, rolled out on its transporter March 4 at Michoud and loaded onto a covered barge for shipment to Kennedy Space Center. It arrived at Port Canaveral in Florida on the fifth day.

The first redesigned tank, ET-120, was shipped from New Orleans to Kennedy Space Center in December 2004. It will launch NASA's STS-114 Return to Flight mission planned for May. It incorporated several safety improvements, including an improved bipod fitting that connects the tank to the Orbit; a video camera mounted on the liquid oxygen feed line to photograph liftoff; reversed bolts on the flange of the tank's mid-section and a new process for spraying the

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Photo by Doug Stoffer / Marshall Center

NASA's workforce transformation discussed during live broadcast

Kyle Daniel, of QD50, asks James Jennings, NASA associate administrator for Institution and Management, a question about Marshall's workforce projections. Daniel asked the question via satellite from Morris Auditorium. Jennings led a live broadcast March 10 from NASA Headquarters to discuss personnel issues facing the Agency. Two questions were accepted from each NASA center and Jennings encouraged input from team members throughout the workforce transformation process.

Marshall astrobiologist identifies new life form

By Rick Smith

The end of a scientific journey -- started five years ago in a frozen tunnel deep below the Alaska tundra -- came in January for Marshall Center astrobiologist Dr. Richard Hoover.

It proved a long, arduous journey for Hoover and his colleagues to complete the process of identifying a unique new life form. For the life form itself, a new bacterium dubbed *Carnobacterium pleistocenium*, the journey to discovery took much longer -- some 32,000 years.

The bacterium -- the first fully described, validated species ever found alive in ancient ice -- is NASA's latest discovery of an "extremophile." Extremophiles are hardy life forms that exist and flourish in conditions hostile to most known organisms, from the potentially toxic chemical levels of salt-choked lakes and alkaline deserts to the extreme heat of deep-sea volcanoes. NASA and its partner organizations study the potential for life in such extreme zones to help prepare robotic probes and, eventually, human explorers to search other worlds for signs of life.

This search is a key element of the Vision for Space Exploration, the ambitious effort to return Americans to the Moon and to conduct robotic and human exploration of Mars and other worlds

See Life form on page 4

NASA celebrates the accomplishments of women

A statement from Frederick D. Gregory, NASA acting administrator

The story of this great nation could not be told without recognizing the important contributions of America's women -- contributions that continue to enrich humanity and brighten this country's future. With this in mind, NASA is proud to stand alongside other U.S. agencies and organizations this month in celebrating the many accomplishments of women during Women's History Month.

This year's theme, "Women Change America," is more than a phrase that marks this occasion; it is an infallible truth which speaks to the virtues and sacrifices of women throughout history. Today, there are more women in positions of influence in America than ever before, and their hard work shows that determination and desire can break down any barrier.

Consider this country's female leadership. Women from an array of social and ethnic backgrounds today hold the top positions in four key agencies in President Bush's cabinet: the Departments of State, Labor, Education and the Interior. There are currently 68 female

members of the House of Representatives and 14 women in the Senate, numbers which rise with each election cycle.

Many talented women have invested their time and energy in NASA as well, from engineers and scientists to administrators and astronauts. As this agency progresses through a transformation and prepares for Return to Flight, we should also recognize those women whose contributions are invaluable to the STS-114 mission -- Commander Eileen Collins and Mission Specialist Wendy Lawrence.

Without question, the women who work here are an asset to the entire NASA Family. They play defining roles in this agency and continuously fulfill their potential, benefiting us all.

I encourage you to attend one of the Women's History Month events held at many of our NASA Centers and to take the time to acknowledge your female coworkers and all the women who play a role in your life. Above all, I ask that you educate yourself about the contributions that women have made to this country and this agency and realize that the world wouldn't be the same without them.

New Web site focuses on NASA's predecessor

Marshall team members and others who want to learn more about NASA's predecessor organization can now go to a new Web site. The NASA History Division has unveiled the site devoted to the 90th anniversary of the National Advisory Committee for Aeronautics (NACA).

The Web site is <http://history.nasa.gov/naca/index.html> and contains biographical sketches, images, movie clips, key documents, and more.

The lack of a government laboratory devoted to the science of flight prompted the creation of the NACA in 1915. The idea was to bring competence to the backwardness of American aviation.

For 43 years the NACA excelled in carrying out its chartered mandate "... to supervise and direct the scientific study of the problems of flight, with a view of their practical solution."

The Committee first surveyed the current stage of development of aircraft and the research needs of aeronautics, then set about building the scientific staff and unique research facilities required. In June 1920, the first laboratory, the Langley Memorial Aeronautical Laboratory in Hampton, Va., was dedicated; aerodynamics became the major research effort and wind-tunnels the chief tool. Within 10 years the results were impressive and its recognition was worldwide.

A second research center, the Ames Aeronautical Laboratory, was constructed near San Francisco in 1939 with a wind tunnel that dwarfed its predecessor at Langley. A third facility, which was later named the Lewis Flight Propulsion Laboratory was built in Cleveland



Who Am I?

I am a fourth grade Cub Scout in this photo. I attended Lynnbrook Elementary School in Bethesda, Md. I moved to Maryland from Haleyville, Ala. I served in the U.S. Armed Forces and worked at three NASA centers. Some people are surprised to learn that I earned a varsity letter in high school gymnastics. Do you know "Who I Am?" Find out on page 4.

Compiled by Michael McLean

See NACA on page 3



Photo by Emmett Given/ Marshall Center

Chamber president talks MSFC business

Brian Hilson, president of the Huntsville-Madison County Chamber of Commerce, spoke at the Marshall Association luncheon March 8. Hilson discussed business opportunities with the Marshall Center and how the Chamber can help the Redstone and Marshall communities facilitate those opportunities.

ET-121

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thermal protection required there; redesign of the bellow, or "joints" for movement, along the liquid oxygen feed line, the 70-foot pipe that feeds liquid oxygen to the Main Engines.

In addition to the ET-120 modifications, NASA's second redesigned tank has been outfitted with temperature sensors and accelerometers, used to measure vibration, which will gather information about how it performs during flight.

Temperature sensors will be mounted on the tank's two forward "bipods." Each tank has two bipod fittings that connect the tank to the Orbiter at the Shuttle's two forward attachment struts. These sensors will monitor the temperature of the bipod web, the flat section of the bipod located between the fitting and the attachment plate.

There also will be seven accelerometers on the tank. Three will be located in the intertank, the Tank's midsection, near the bipods, to measure any vibration caused by changes in the aerodynamic load, or stress. The other four accelerometers will be located in the cable tray of liquid oxygen protuberance air load ramps and will be used to determine whether there is need for the ramps in future tank modifications.

"The instrumentation on ET-121 will confirm what our computer models tell us happens during launch and ascent," said Sandy Coleman, manager of the External Tank Project, an element of the Space Shuttle Propulsion Office at NASA's Marshall Center. "Though computer models are invaluable, the information gained from an actual launch will give us an even better picture."

NACA

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in 1940 to perform basic research, develop and test aircraft engines, and study fuels. Research on the jet engine began there in 1943.

World War II focused aeronautical research on combat aircraft and NACA's work on aerodynamics and structural research resulted in extremely effective fighter planes. Postwar research at higher speeds led to high-altitude drop-test models to gather flight data; then, to using rockets to launch models to transonic (speeds from just below to just above the speed of sound) and supersonic speeds. Langley acquired a surplus naval station on Wallops Island, Va., and called it the Pilotless Aircraft Research Division. Next, a High-Speed Flight Research Station was established at Muroc (later Edwards), Calif., for a series of special research aircraft.



Photo by Doug Stoffer/ Marshall Center

Marshall volunteer take science to students

Bill Carswell, left, of Cherokee Nations Industries, Inc., a volunteer with the Marshall Speakers Bureau, demonstrates to 400 students at Mountain Gap Middle School this month how warm air rises because of gravity. He gets help testing his theory from a student at the school.

Over 100 women and men from the Marshall Center -- scientists, engineers, researchers and others -- make up the Marshall Speakers Bureau. They are ready to share knowledge and enthusiasm about their contributions to the Vision for Space Exploration with civic groups, associations, schools and community organizations.



Astrobiologist Richard Hoover, right, and microbiologist Dr. Elena Pikuta in the astrobiology laboratory at the National Space Science and Technology Center.

Life form

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in our Solar System, which might conceal life forms unimaginable to us -- thriving in conditions few Earth species could tolerate.

In 1999 and 2000, Hoover, a researcher at the Marshall Center, time-traveled back to the Pleistocene via the U.S. Army's Cold Regions Research and Engineering Laboratory, or "CRREL tunnel." The research site near Fox, Alaska, just north of Fairbanks, was carved by the Army Corps of Engineers in the mid-1960s to enable geologists and other scientists to study permafrost -- the mix of permanently frozen ice, soil and rock -- in preparation for construction in the early 1970s of the Trans-Alaska Oil Pipeline.

Hoover initially went to the CRREL tunnel in search of "psychrophiles" -- organisms that live only at extremely low temperatures. Hoover initially suspected the samples he collected there, from ice more than 30 millennia old, were diatoms, or microscopic, golden-brown algae. But closer study at the nearby University of Alaska revealed not diatoms but something much more interesting -- an assortment of bacterial cells, many of which came to life as soon as the ice thawed.

Hoover and his collaborator, microbiologist Dr. Elena Pikuta of the University of Alabama in Huntsville, studied the samples at the National Space Science and Technology Center, the research consortium operated by NASA and Alabama universities. They found the samples contained anaerobic

bacteria that grew on sugars and proteins in total absence of oxygen. The bacteria had frozen near the end of the Pleistocene Age, which extended from about 1.8 million years ago to just 11,000 years ago -- and earned the new organism its name.

Further testing revealed the organism was not a psychrophile at all, but a "psychrotolerant" -- not an organism that thrives only at very cold temperatures, but one capable of enduring deep cold that resumes normal activity when temperatures rise.

Hoover, Pikuta and their collaborators -- Damien Marsic of the University of Alabama in Huntsville, Professor Asim Bej of the University of Alabama at Birmingham and Dr. Jane Tang and Dr. Paul Krader of the American Type Culture Collection in Manassas, Va. -- published their discovery in the January issue of the *International Journal of Systematic and Evolutionary Microbiology*. The bimonthly periodical, the official journal of record for new bacterial species, is produced by the Society for General Microbiology.

"Astrobiologists ask, 'Is life strictly terrestrial in origin, or is it a cosmic imperative, an undeniable, universal biological truth?' That possibility is central to our desire to explore the universe," Hoover said. "The existence of microorganisms in these harsh environments suggests -- but does not promise -- that we might one day discover similar life forms in the glaciers or permafrost of Mars or in the ice crust and oceans of Jupiter's moon Europa."

Although many people think of bacteria merely as a cause of illness or decay, Hoover and Pikuta are quick to defend the organisms, which they call highly advanced marvels of natural engineering. There are approximately 7,000 validly described species of bacteria, though far more are

surmised to exist. The vast majority are harmless to humans. Only a very few -- less than 1 percent of all known species -- are dangerous. And many, Hoover noted, are valuable to human life, aiding us in numerous ways: culturing wine, dairy products and other foods; assisting in the biological extraction of gold and other precious metals from ore wastes; and aiding production of valuable proteins and life-saving drugs.

Carnobacterium pleistocenium could even offer new medical breakthroughs. "The enzymes and proteins it possesses, which give it the ability to spring to life after such long periods of dormancy, might hold the key to long-term, cryogenic -- or very low temperature -- storage of living cells, tissues and perhaps even complex life forms," Hoover said.

"Life is far more diverse, and far more resistant to conditions we consider hostile, than was thought possible only a decade or two ago," he adds. "Studying these organisms helps us understand that life may be far more widespread in the cosmos than we previously imagined."

The writer, an ASRI employee, supports the Public Affairs Office.



Who Am I?

Emil Posey is the office manager for the Space Transportation Support Office. He leads 25 employees in supporting the Shuttle Propulsion and Space Transportation Program Projects Office. Posey came to Marshall in 1986. His wife, Rhodora, works in the Office of Inspector General at Marshall. They have a daughter and two sons.

Announcements

Scholarship Ball set for April 14 at Von Braun Center North Hall

The 5th Annual Black-Tie Scholarship Ball will be held at 7 p.m., April 14 at the Von Braun Center North Hall. The event is sponsored by the Alabama A&M University Office of Corporate Relations. Tickets are \$50 and may be purchased from Madeline Hereford of the Marshall Center Equal Opportunity Office.

SE Software Engineering Conference is March 28-31

The fourth annual Southeastern Software Engineering Conference will be March 28-31 at the Von Braun Center. The event is an opportunity to learn how advancing software technologies are impacting commercial, space and military applications. For more information, go to <http://www.se2conference.com>

MARS Tennis Club is seeking new members for 2005

The MARS Tennis Club's 2005 Membership Drive is under way. NASA employees, retirees, on-site and off-site contractors, and a limited number of Army and Department of Defense employees are eligible to join. Yearly dues are \$25 per individual and \$30 per family. League dues are \$15 for singles and \$15 for doubles team. See "Inside Marshall" for details or call Ronda Moyers at 544-6809.

AIAA dinner topic is 'Mars: Rovers Today, Humans Tomorrow'

The American Institute of Aeronautics and Astronautics will hold a dinner meeting at 7 p.m., April 21 at the Holiday Inn Research Park in Huntsville. Dr. Benton C. Clark, AIAA Distinguished Lecturer and chief scientist of Space Exploration Systems at Lockheed Martin Co., will speak on "Mars: Rovers Today, Humans Tomorrow." The cost is \$15 for students and \$20 for all others. Call Kevin Higdon at 256-679-3143 for reservations by April 20.

Shuttle Buddies to meet March 28

The Shuttle Buddies will meet at 9 a.m. March 28 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757.

Entries being accepted for 2005 Software of the Year Award

Entries are being accepted for the 12th Annual NASA Software of the Year Award. This award recognizes NASA team members who develop exceptional software for use by NASA. The award includes the NASA Software Medal certificate and up to \$100,000. NASA centers, facilities, major contractors, supporting universities and small businesses may participate. Entry deadline is April 15. For contest rules and submission guidelines, go to <http://icb.nasa.gov/>

Mars Ballroom Dance Club spring dance is April 9

The MARS Ballroom Dance Club spring dinner dance will be April 9 at the Von Braun Center East Hall from 6:30 p.m. to 11 p.m. Dinner will be served at 7 p.m. Tickets are \$20 for MARS Club members and \$25 for all others. Tickets may be purchased until April 5 from MARS Club members, including Linda Kinney at 461-0230 or Hugo Berry at 572-0047.

Management Operations Office to meet March 24

The Management Operations Office retirees will meet at 10 a.m. March 24 at the Cracker Barrel Restaurant in Madison. For more information, call 539-0042.

Advanced Space Propulsion Workshop set for April 7-8

The 16th Annual NASA Advanced Space Propulsion Workshop is set for April 7-8 at the University of Alabama in Huntsville Beville Center. This year's workshop will focus on technology readiness levels, relatively far-term space propulsion and power concepts and technologies that hold the promise of enabling ambitious robotic and human exploration missions for the 21st century. Register for the workshop at <http://www.uah.edu/research/PRC/ASPW>

Classified Ads

Miscellaneous

Pool table, 4'x8', slate top, \$600. 256-852-8545

Dining room table, 6 chairs, buffet, \$400. 256-852-8750

Home entertainment system, Yamaha surround, 6-channel, 480 watts, 5 speakers, \$400. 256-355-5310

Large formal white sofa, \$100; formal green chairs, \$25; exercise bike, \$20. 430-6842

Dell 4600, 2.6Ghz-P4, 512Gb-DDR, 40Gb-HD, FX5200, 19" monitor, printer, \$575. 489-0136

Jungle/Safari scene Brandee Danielle crib set, 4-piece, lamp, mobile, & matching 16x20 photo, \$175. 837-7465

Lowe boat, 12' w/trolling motor and marine battery, \$350. 214-0110

Brunswick Royal Crown III pool table, regulation size, black lacquer/chrome, matching overhead light, \$2,400. 256-479-0042

Craftsman mower, 10HP, 30" cut, instruction manual, \$200. 348-7146

DVD player, complete w/handbook, cables, and accessories, \$150. 883-9789

Pennsylvania House video cabinet, Cherry, up to 30" TV, VCR/DVD, \$750. 931-427-2059

Two Nikon 800S SLR camera bodies w/MF21 data backs, \$225 each, \$400 for both. 256-656-2965

AKC black & tan Dobermans, born 1/17/05, parents on site, 1st shots, wormed, vet checked, \$450. 256-423-4575

1987 Kawasaki Bayou 300, needs work, \$475; GlowWarm ventless blue flame gas heater, \$65. 256-753-0020

Oak dining table w/6 chairs \$575; wooden desk, \$20; bookcase w/glass doors, \$50. 256-534-0930

Computer desk, natural wood color, pull-out keyboard and drawers, hutch, cork board, \$150. 325-9264

1993 Shasta 21' pull behind camper w/awning, sleeps 5, \$5,000. 256-694-0501

Graco Duo Glide double stroller, navy blue, \$35. 931-433-1888

1983 Honda XL600R dirt bike, \$750. 256-353-6358

Dell CRT monitor (black), 17", 4 months old, \$30. 851-8491

PA system, Cerwin, Vega, amp 800W, 8-channel Yamaha mixing board, EQ, 2-Kustom 18" speakers, \$695. 256-883-7088

Delta mobile base for Unisaw w/50" extension table, 50-

289, new, \$100. 830-1775

Craftsman workbench, lighted power wall, new in box, \$400; computer desk, \$150. 776-9165

Squire fireplace insert, cast iron w/blower, 22"Dx35"Wx26"H, \$125. 256-586-5561

Steel wire dog cage, 24"Lx19"Wx20"H, w/metal pan, \$40. 882-2369

Dell 4600, \$780; LCD, 19", \$310; Dell 4600 w/printer, 19" CRT, \$575; 3-in-1 printer, \$71. 655-1986

Nikon N90 35mm SLR w/Nikon 35-80mm AF F/4.0-5.6D zoom lens, \$400. 772-9930

Krups Cappuccino maker, \$25. 464-9408

Full-size bedroom suite w/mattress, \$100; coffee/end tables, \$45; washer & dryer, \$100; desk, \$35; printers, \$20. 520-2802/Ron

Four Indy 500 tickets May 29, 2005, seats are in the Pad-dock, \$100 each. 679-3565

Diamond solitaire ring, .25 carat, \$75; diamond cluster heart-shaped ring, \$125. 683-1279

Cannon inkjet printer, i250, new, \$25; 17" KDS CRT moni-tor, XF-7b, \$60. 683-7683

Vehicles

1999 Ford Explorer, 4x4, 75k miles, \$8,299. 353-3229

2000 Toyota Tundra SR5 truck, 4-door, loaded, 52k miles, new tires, LineX bedliner, \$13,500. 797-7251

2004 Honda Pilot EX, leather, loaded, Sage Brush Pearl, 22k miles, Honda extended warranty, \$26,500. 652-6268

2005 Chevy Equinox LT, 2wd, white, leather, 6-cd, tinted windows, v6 10k miles, one-owner, \$22,500. 652-8383

2003 Nissan Pathfinder, v6, 2wd, automatic, 4-door, 22k miles, leather, cd, tow, silver, \$23,500. 256-880-3337

2001 Mustang, 6-cyl., automatic, all-power, cd player, 70k miles, rebuilt title, \$4,500. 256-586-7013

2000 Ford Ranger XLT, extended cab, white, 62k miles, 3.0L/v6, am/fm/cd, all-power, \$6,000. 658-7719

2000 F250 crew-cab, 4x4, Lariat, V10, auto, white/tan, 91k miles, \$18,500. 725-3798

1985 Honda XR250, 4-stroke, new seals/gaskets, \$1,000. 931-937-7830 after 5 p.m.

2003 Honda Odyssey EX, leather, redrock pearl exterior, 53k miles, \$20,500. 256-508-6989

2004 Ford Expedition, under warranty, all-power, 2wd,

4.6L/v8, 25k miles, red/gray interior, cd/dvd, \$21,900. 508-6863

2002 Isuzu Axiom, 4-door, auto, 2wd, moonroof, 6-disc cd, 50k miles, 3.5/v6, \$12,500. 883-2065

1995 VW Passat GLX sedan, 106k miles, auto, leather, 6-cd changer, ABS, airbags, \$4,000. 527-1634

1998 Harley Davidson Sportster, windshield, backrest, extra chrome, 3.6k miles, \$6,000. 859-0889/1:30-8 p.m.

2002 Ford F250 Superduty Crewcab Lariat, 7.3 diesel, 4x4, white, 127k miles, \$27,000. 497-3518

2000 Ford Explorer Sport, burgundy/black, v6, 5-speed, 2wd, am/fm/cassette/cd, 68k miles, one-owner, \$6,500. 256-828-9798

1995 Toyota Previa 7-passenger van, dual skylight, 163k miles, \$6,000. 256-828-3896

1991 Toyota Camry LE, v6, silver w/gray interior, \$1,750. 882-1385

1994 Lexus ES300, emerald green, tan leather, new belts, hoses, garaged, sunroof, 170k miles, \$5,000. 520-3083

2001 Tahoe LT, 4wd, 3rd row, leather, towing, climate control, 68k miles, \$19,700. 256-541-2435

2000 Acura 3.2TL, 74k miles, 4-door sedan, moonroof, automatic, heated leather seats, new tires, \$12,900. 881-8674

2000 Silverado Chevrolet, red, extended cab, v6, running boards, bed rails. 859-4663

1973 Corvette, 350 CID, auto, air, T-tops, matching num-bers, white w/black leather, \$11,000. 256-964-5312

Wanted

Soloflex or bowflex exercise machine. 714-8496

Found

Gold necklace in the stairs of Building 4200. 544-8824

MARSHALL STAR

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